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The Cement Mill Edition of *Concrete*

The Cement Mill Edition of CONCRETE is edited exclusively for those interested in the manufacture of portland cement and related products.

Its pages are devoted to discussions of plant design, management, operation, production efficiency, chemical research and control, quarry operation, progress and news of the industry.

The Cement Mill Edition also contains all the material published in the corresponding Regular Edition and so provides news of the uses and merchandising of the materials whose manufacture is discussed in the Mill Edition.

The Regular Section furnishes mill operating officials and mill executives valuable points of contact with the users of the materials they produce.

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Cement Mill Section of
Concrete

AUGUST
1933

Strength Tests of Cement Require Changes in Methods

Compression or Tension Tests of Graded Sand Mortar of Plastic Consistency Urged as Reliable Index of Cohesive Strength—The Test Procedure

By E. W. REED-LEWIS
Director of Research, The Super Cement Company, Detroit, Mich.

THE relative concrete-making properties of different brands or varieties of portland cement afford a field for study that has rapidly increased in importance with the advances that have been made in recent years toward the development of cements of higher quality. Choice of proper testing methods is a vital factor in any such studies.

It is the purpose of this article to comment briefly on certain methods of test that are, unfortunately, sometimes accepted as furnishing significant data; and to present in somewhat greater detail suggestions covering other methods of test which, it is believed, are better suited to the purpose in view. The scope of the article, as indicated by its title, will be confined to the subject of strength tests.

The most cursory analytical consideration of the cohesive strength of concrete leads to the conclusion that this property is derived from the hardened matrix, formed by the chemical union of cement and water; and that the degree of cohesive strength attained is dependent on at least two distinct properties of this hardened matrix, viz.: its own cohesive strength, and its ability to adhere to the surfaces of the aggregates.

Neat Cement Paste Specimens

Studies of the cohesive strength of neat cement-water pastes have frequently been undertaken, and the effort made to establish a relation between such strength values and those of concrete. A relation of this kind has not been satisfactorily established, probably for the reason that such tests of neat cement-water pastes afford no indication of their adhesive properties.

Similar efforts have been made, with even less success, to establish a relation between the strength of concrete and that of "standard sand mortars," in which the sand is composed of particles of comparatively uniform size. There are probably several reasons for failure to establish this latter relation. One is the overwhelming influence of the skill and energy of the operator in mixing and molding mortars of this character, which are usually of a mix and consistency that is harsh and unworkable, having to be compacted by pressure into the molds; another is the low surface area of the usual "standard sand," and the uniformly large size of the interstices in a sand of this character, not comparable at all to conditions which obtain with sands of graded particle size, such as are used in most concretes.

Why Test Results Vary

Finally, efforts are frequently made to forecast the properties of field concrete by testing specimens of similar concrete, prepared either in the laboratory or in the field. Tests of this character are usually compression tests on 6 by 12-in. cylinders, though beam tests are also commonly made, and there have been some notable studies of the tensile strength of concrete specimens.

Such tests of comparatively large specimens of concrete, using aggregates and mixes and cement-water ratios comparable to those in field use, have been looked upon generally as having more significance than any other method of tests, perhaps quite naturally.

It is particularly unfortunate, therefore, that such wide discrepancies and apparent inconsistencies persist in the results obtained—discrepancies and inconsistencies which are too frequently attributed to lack of uniformity in the quality of the cement or of the aggregate, whereas they could be traced, in a vast majority of cases, to variations in technique, unsuitable or faulty manipulation of testing equipment, or any combination of a number of important factors involved in the preparation and testing of such specimens.

Probably the most outstanding discrepancy encountered in compression tests of concrete is the difference in test values obtained between specimens that have been hand-mixed in the laboratory, and specimens of presumably similar concrete that has been machine-mixed in a batch of substantial size, as it would be in ordinary field practice. Almost invariably, test values on the hand-mixed

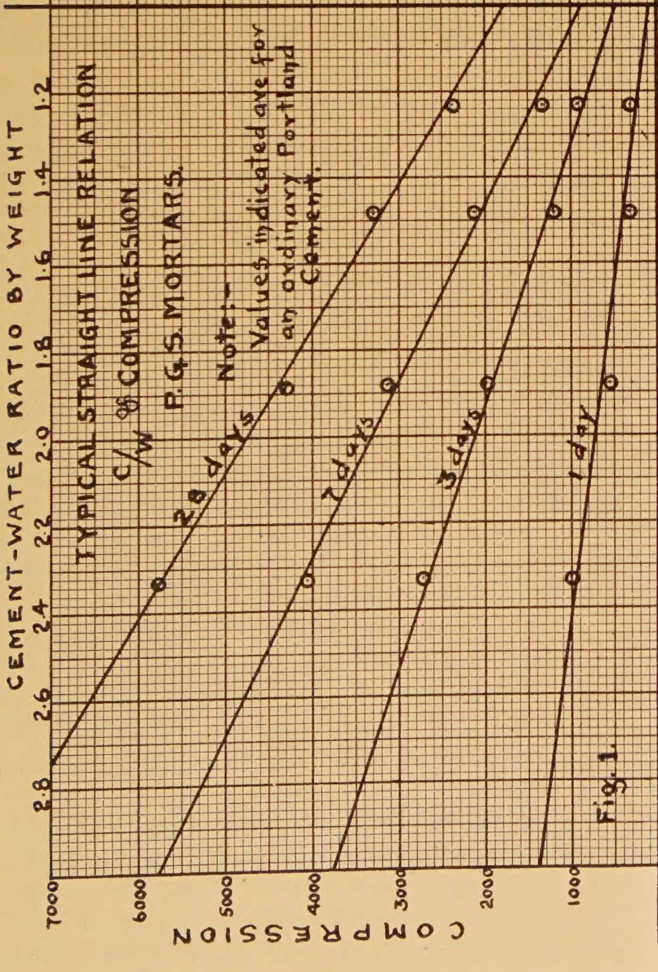

Fig. 1.

TYPICAL STRAIGHT LINE RELATION C/W vs COMPRESSION P.G.S. MORTARS.

Note:- Values indicated are for an ordinary Portland Cement.

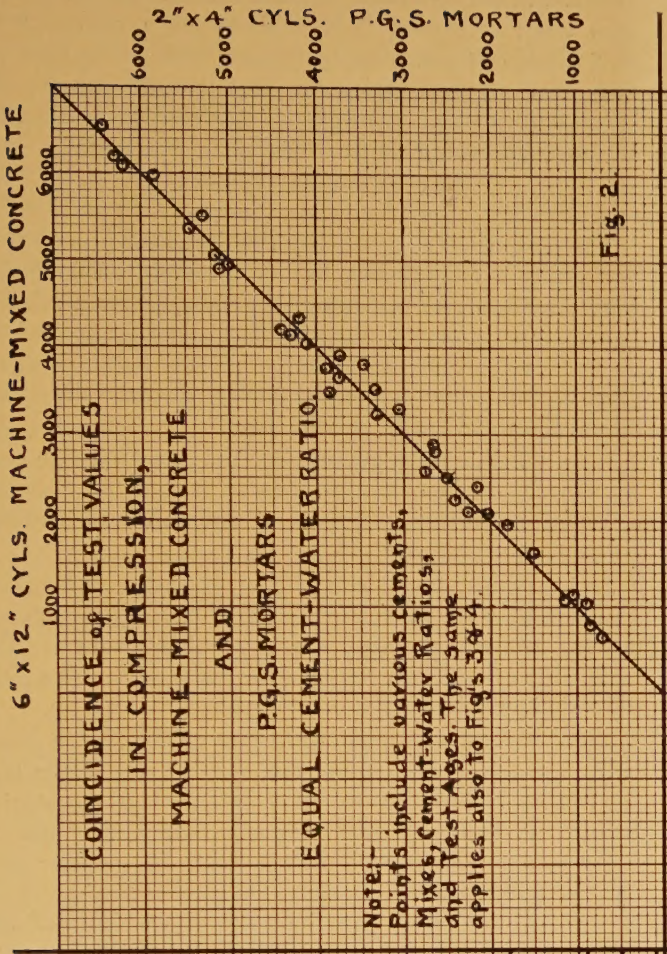

Fig. 2.

COINCIDENCE of TEST VALUES IN COMPRESSION, MACHINE-MIXED CONCRETE AND P.G.S. MORTARS EQUAL CEMENT-WATER RATIO.

Note:- Points include various cements, Mixes, Cement-Water Ratios, and Test Ages. The same applies also to Fig's 3 & 4.

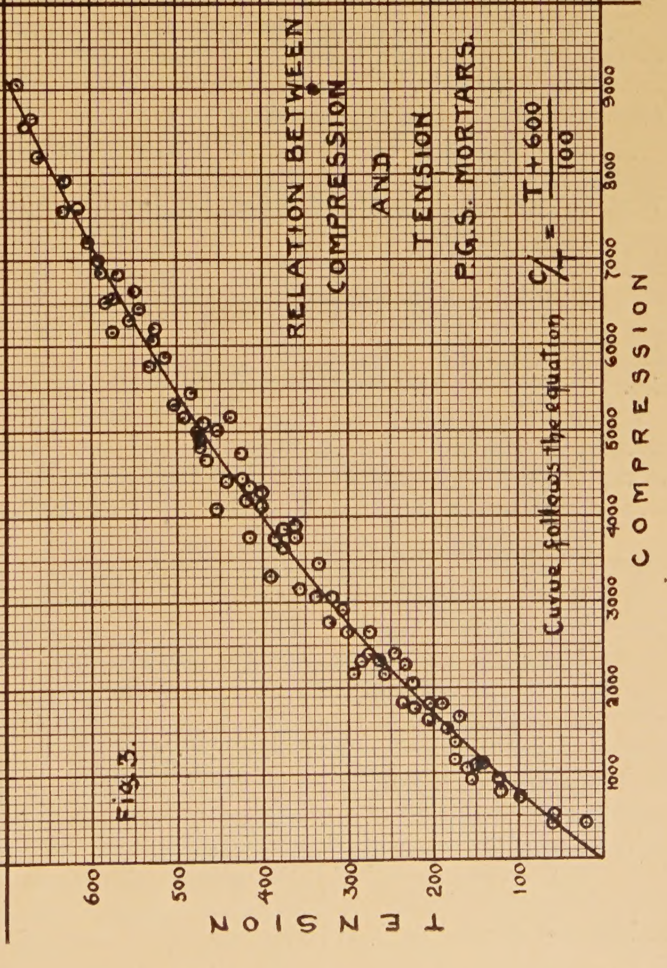

Fig. 3.

RELATION BETWEEN COMPRESSION AND TENSION P.G.S. MORTARS.

Curve follows the equation $\frac{C}{T} = \frac{T+600}{100}$

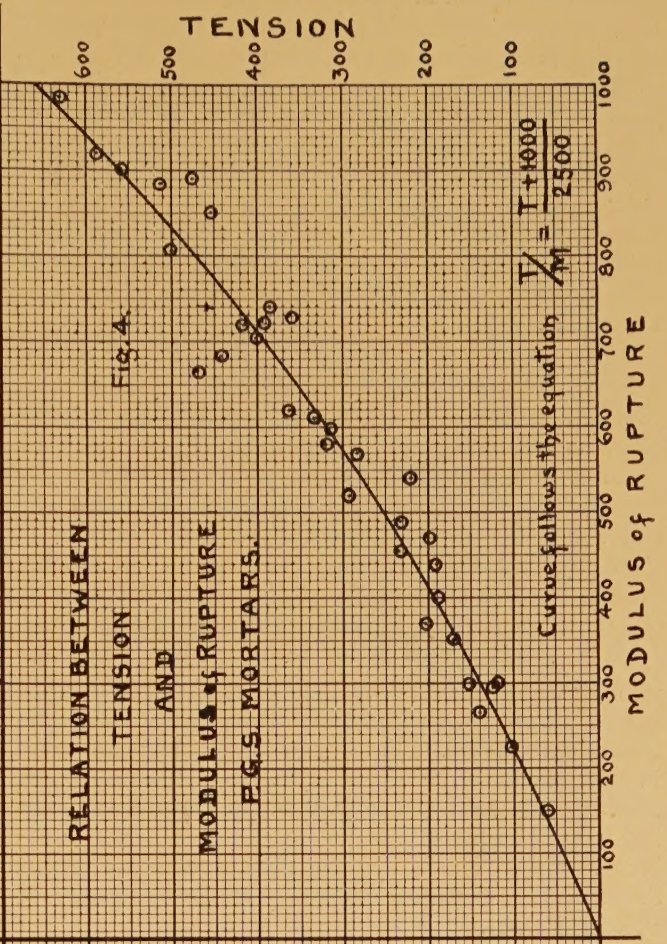

Fig. 4.

RELATION BETWEEN TENSION AND MODULUS of RUPTURE P.G.S. MORTARS.

Curve follows the equation $\frac{T}{M} = \frac{T+1000}{2500}$

specimens are from 20 per cent to 50 per cent lower than on machine-mixed concrete. It has not been found possible to establish a rational relation between the two.

Of the test methods so far considered, there should be little argument against selecting the compression test on 6 by 12-in. cylinders of machine-mixed concrete as offering the most reliable indication of the probable quality of field concrete. The chief objections to a wider use of this form of test are the high costs involved for equipment, materials, storage space, and the highly skilled operatives who are vitally essential to concordant and reliable test results.

Graded Sand Mortars Most Reliable Indicators

A further method of test that has received considerable attention in recent years is that in which specimens are made of graded sand mortars of plastic consistency. In the appendix to this article, the procedure that has been followed in the research laboratory of The Super Cement Company for the past eleven years with this test method, is described in sufficient detail to be readily followed by any testing laboratory. Evidence of the significance of this form of test is offered in the accompanying diagram as follows:

Figure 1 illustrates the typical straight-line relation between "Cement-Water Ratio by Weight" and the strength in compression of 2 by 4-in. cylinders of plastic graded sand mortars, at 1, 3, 7 and 28 days. A similar straight-line relation in the case of tests on concrete cylinders has been shown to obtain by Inge Lyse, Lehigh University, *Proceedings* of the American Society for Testing Materials, Vol. 32, Part II.

Figure 2 shows the typical coincidence of test values, as between 6 by 12-in. cylinders of machine-mixed concretes and 2 by 4-in. cylinders of plastic graded sand mortars of similar cement-water ratios.

Figure 3 illustrates the relation, with plastic graded sand mortars, between test values obtained on 2 by 4-in. cylinders in compression and tensile test values on briquettes of the usual shape made from the same mortars. It is noteworthy that the relation shown in this figure is closely similar to that found by other investigators who have studied the relation between tensile and crushing strengths of concrete specimens of comparatively large size.

Figure 4 shows the relation, with plastic graded sand mortars, between tensile strength and values for modulus of rupture, the latter obtained from beam specimens of 1 in. square section, a span of 9 in., loaded at the center.

Many Cements Included

It will be noted that the points shown in Figures 2, 3, and 4, cover various cements. These included ordinary portland cements and the so-called high-early-strength portland cements, as well as a wide range of mixes, cement-water ratios and test ages. Many of the points in Figures 3 and 4 represent test values on only one cylinder or beam; tensile strength values shown are usually the average of three P. G. S. briquettes.

Considering the variables involved in the tests illustrated by these figures, it is felt that entirely satisfactory concordance was obtained in both the compression tests and the tests in tension. That better concordance was not obtained in the beam tests is not a unique experience with such tests; it should be considered as a reflection on the technique and/or the equipment used, rather than occasion for any irrational assumption that mortars of similar strength in both compression and tension would actually vary in their flexural strength.

Conclusions

The conclusion suggested by the data here presented is that either a compression test or a test in tension of a graded sand mortar of plastic consistency offers a reliable index to the cohesive strength that can be expected in machine-mixed concrete, under similar conditions with respect to the factors of cement quality, cement-water ratio, temperature and curing conditions.

It follows that these graded sand mortars of plastic consistency should be a suitable means for studying the relative concrete-making properties of different brands or varieties of portland cements.

Such mortars, tested either in compression or tension, should also serve satisfactorily as a standard acceptance test for cements, provided that a reliable source for the three sizes of sand involved can be established, and a simple technique adopted for carrying out the test.

The method would have the further advantages of economy in materials and equipment, particularly if the tensile test were adopted, since all cement testing laboratories are already equipped with briquette testing machines of fairly standard design, and their personnel is familiar with their proper operation. Finally, the plastic consistency of these mortars minimizes the influence of the skill and energy of the operator, which is such a disturbing factor to the results obtained with the present standard sand mortar briquette test.

* * * *

APPENDIX

TEST METHODS WITH PLASTIC GRADED SAND MORTARS FOR STUDIES OF CEMENTS

Types of Specimen. For compression tests, either 2-in. cubes or 2 by 4-in. cylinders are suitable. For tests in tension, the standard type of briquette may be used. For determinations of modulus of rupture, beams of 1 in. square section by 10 in. in length are suggested, loaded at the center, with a 9-in. clear span between supports.

Aggregate. A suitable grading of particle size is obtained by using three sizes of sand, combining these in the mixing process in the proportions by weight of one part fine, two parts medium, and three parts coarse. The three sizes should approximate the following:

Fine: Passing No. 50 sieve, with not more than 30 per cent passing No. 100 sieve.

Medium: Passing No. 30 sieve, retained on No. 50 sieve.

Coarse: Passing No. 20 sieve, retained on No. 30 sieve.

Range of Mixes. For routine tests, a mix by weight of one part cement to three parts graded sand is used. In establishing the relation between strength and cement-water ratio for different cements, a range of mixes between 1:2 and 1:4 may be employed with most cements, and proportions as lean as 1:5 with some of the effectively ground modern portland cements.

Consistency of Mortar. The desired consistency is such that, with a 1:3 mix, a penetration of from 20 to 30 millimeters is obtained with the "Modified Vicat Apparatus" (see Supplementary Notes). With mixes substantially richer or leaner than 1:3, the attainment of a comparable consistency or placeability can best be left to the judgment of a skilled operator who will, of course, record the cement-water ratio used in each case.

Batch Quantities. A standard batch consists of 2,000 grams, combined weight, of cement and sand, with the determined quantity of water.

Mixing. Mixing is performed in a round-bottomed graniteware bowl of about one gallon capacity, by vigorous and continuous stirring, squeezing, and kneading with one hand, protected by a rubber glove; materials are introduced into the batch in the following manner:

(1) The mixing water is measured into the bowl;
(2) The cement is added to the water and mixed for 30 seconds;
(3 The fine sand is added and mixed for 30 seconds;
(4) The medium sand is added and mixed for 30 seconds;
(5) The coarse sand is added and mixed for 60 seconds. Total mixing time, two and one-half minutes.

Molding. Immediately following the mixing, the molds are filled in layers, each layer being lightly puddled with the gloved fingers to insure complete filling of the molds. Cubes, beams and briquette molds are filled in two layers; 2 by 4-in. cylinders in four. A slight excess of mortar is then uniformly distributed on the top of the molds. This excess mortar is brought to a quaking condition by a patting application of the flat of a trowel and immediately thereafter is struck off level with the top of the molds by a sawing motion of the edge of the trowel, the blade of the trowel being in an approximately vertical plane during this latter operation.

With coarsely ground cements, and in the leaner mixes, there is usually some loss of water between the molds and the plates they rest on. Experience suggests that this is not a factor of sufficient moment to warrant taking extraordinary pains to avoid it. Such a loss of water is, moreover, analogous to what would probably occur in field practice. To minimize this loss, however, and to insure that cement is not lost with the water that may escape, it is the practice to introduce a strip of wet paper between the molds and the plate on which they rest.

Curing. Immediately after molding of the specimens is completed, they are placed in the moist closet, where they remain until removed from the molds, 24 hours from the time mixing of the mortar commenced. Thereafter, all specimens not tested at the 24-hour period are immersed in water until tested.

Temperatures. Temperature control is, of course, just as important with this form of test as with any other.

SUPPLEMENTARY NOTES

Sources of Sand. Ottawa Silica Company, of Ottawa, Illinois, supplies what they term "banding sand." This is suitable as the fine sand for these P. G. S. tests; they also supply a "No. 30 sand" which is suitable for the medium size. Both of these sands are sold in 100-lb. bags, at 75 cents per bag. Standard Ottawa sand is entirely suitable for the coarse size. On the other hand, the research laboratory of the Super Cement Company for many years screened the desired sizes from local commercial sands with entire satisfaction and at trivial cost.

Modified Vicat Apparatus. The modification of the Vicat apparatus consists solely in substituting for the standard movable rod weighing 300 grams, a similar rod weighing 100 grams. Such a rod can readily be made from seamless brass tubing, ½-in. outer diameter, No. 22 A. W. G. metal, equipped at the lower end with an internal bushing and set screw to hold the shank of the standard 1-cm. plunger in position; and at the upper end with a light cap to retain the shot used to bring the rod to exact weight. As in the case of the 300-gram rod, the 100-gram weight of the modified rod includes the weight of the 1-cm. plunger and the collar carrying the indicator.

In determining consistency of the mortar, immediately on completion of the mixing of a standard sized batch the Vicat ring, resting on a glass plate, is filled with the mortar and struck off level in precisely the manner described for filling and striking off cube molds; the mortar-filled ring resting on the glass plate is then placed in position under the rod, the 1-cm. face of the plunger is brought in contact with the surface of the mortar at about the center of the ring, the rod is released at precisely 3 minutes from the time the cement was added to the water in the mixing operation, and the depth of penetration is read 30 seconds after the rod is released.

With some cements that have a false setting tendency, a rapid stiffening of the mortar in the Vicat ring will be noted, to the extent that at the 3-minute period a 25-mm. penetration might be obtained, while 30 seconds later if the rod were released at another point on the surface, there would be a penetration of not more than 2 or 3 mm.

What cement-water ratio to use with such a cement is left to the judgment of the investigator, and will no doubt be determined by the purpose of the particular studies he has in hand. Cements that show this early stiffening characteristic in P. G. S. mortars usually behave in the same manner when used in field concretes; in both cases the stiffening can generally be broken and the original consistency regained by reworking—a trivial operation in the laboratory, but rather an expensive one to contemplate in the placing of concrete in the field.

Early Plans for Safety Congress Get Under Way

Plans and programs for the twenty-second annual safety congress, to be held at Stevens Hotel, Chicago, October 2 to 6, are taking shape.

While the usual sectional sessions will be held, their number will be reduced and each will be devoted to a specific industry's problems. General subjects will be handled in "subject sessions."

Cement Companies Co-operate

Varying wage increases coincident with price advances of 25 cents a barrel were announced by a majority of cement companies early in July.

A lessening of working hours in conformity with the national decree was also announced.

Two Short Rotary Kilns Comprise New Burning System

By EUGENE J. WECHTER
Director of Research
Louisville Cement Co., Louisville, Ky.

Heat from Lower Kiln Utilized for Drying and Preheating—Longer Burning Zone Permits Lower Maximum Temperature—Physical and Chemical Properties Improved—Heat Loss Greatly Reduced

A NEED frequently has arisen, in the process of burning lime and cement, for a more uniform burn than is obtained by the usual practice in a vertical or rotary kiln. In lime burning it was desired to burn limestone fines and dust as well as coarser size rock. Before this could be attained a more uniform burning temperature was needed and the ability to hold this uniform temperature for a longer time appeared definitely necessary to obtain the same degree of burn in the fines and coarse size rock.

Eliminating Need for Excessive Temperatures

In common rotary kiln practice the feed in the kiln gradually increases in temperature until it reaches the hot zone and is near the discharge end of the kiln. Inasmuch as the hot zone represents only a short distance in the kiln the temperature of this zone must be high to effect calcination and burning of the cement or lime in the relatively short length of time that the kiln feed is present in this zone. In order to compensate partly for the short time the material is present in the burning zone, the temperature at this point may exceed the temperature that gives best physical and chemical properties in well burned lime or cement.

In usual vertical kiln operation the time in the hot zone is longer, but the temperature of this zone is difficult to control. The best operation of the vertical kiln is probably more dependent upon a well sized rock than is the case in common rotary kiln practice.

One Rotary Kiln Above Another

In this new method developed for the burning of lime and cement two rotary kilns are used,[1] one being placed above the other in such manner that the discharge from the top kiln feeds by gravity into the burning end of the lower kiln. In process the raw material is fed into the upper kiln and progresses through the kiln counter-current to the hot gases. This is important, as best drying and preheating efficiency is obtained by passing the heated gases counter-current to feed movement, the same as in usual rotary kiln practice. The preheated material is discharged from the upper kiln at a temperature of 1,400 F. to 1,800 F. (depending on the temperature of the lower kiln) into the burning end of the lower kiln. In the lower kiln the combustible gases and kiln feed are in parallel flow, and the preheated kiln feed is quickly raised in temperature. This preheated material is in a suitable condition to be rapidly heated to the desired burning temperature while traveling the first 20 ft. of the lower kiln and this temperature remains substantially constant during the remaining passage through the kiln. With a kiln 125 ft. long, more than 100 ft. of the kiln has a relatively constant temperature for two hours rather than an excessively high temperature for a relatively short time.

Sufficient time is required for satisfactory chemical reactions to take place in the burning process, and this new method of burning affords the necessary time with the desired conditions of temperature control. Following the decarbonization in lime burning the molecular rearrangement accompanying shrinkage in volume is dependent upon the temperature and the length of time that this temperature is maintained. With this new method of burning the kiln feed may be held at a substantially constant temperature for a time sufficiently long so that the fines as well as coarser rock in lime burning will have the same uniform burn and heat treatment, and the temperature may be controlled to give the desired physical and chemical properties.

Heat of Exit Gases Utilized

As the completely burned cement or lime is discharged from the lower kiln, the hot gases at this point are conducted by means of a gas flue to the discharge end of the upper kiln. In passing through the insulated gas flue the temperature drop is approximately 50 degrees for 100 ft. of flue.

This drop in temperature represents a relatively small loss in the heat energy that is available for preheating. After passing through the upper kiln these gases are discharged at a temperature of 500 to 700 F.

Advantages of Method

Increased efficiency and economy result from this method of burning. The ability to use all small sizes of rock, including fines, in lime burning reduces the cost of preparing raw materials. The extremely high temperature of burning zone that is usually necessary in ordinary kiln practice is not necessary in this new method of burning, for with a longer burning zone a lower temperature can be used, resulting in less heat radiation. The discharging lime or cement has a lower temperature than in common kiln practice, and less heat is carried from the kiln by the discharging of the burned product.

The efficiency of this method is indicated by the lower exit gas temperature from the upper kiln, as a temperature

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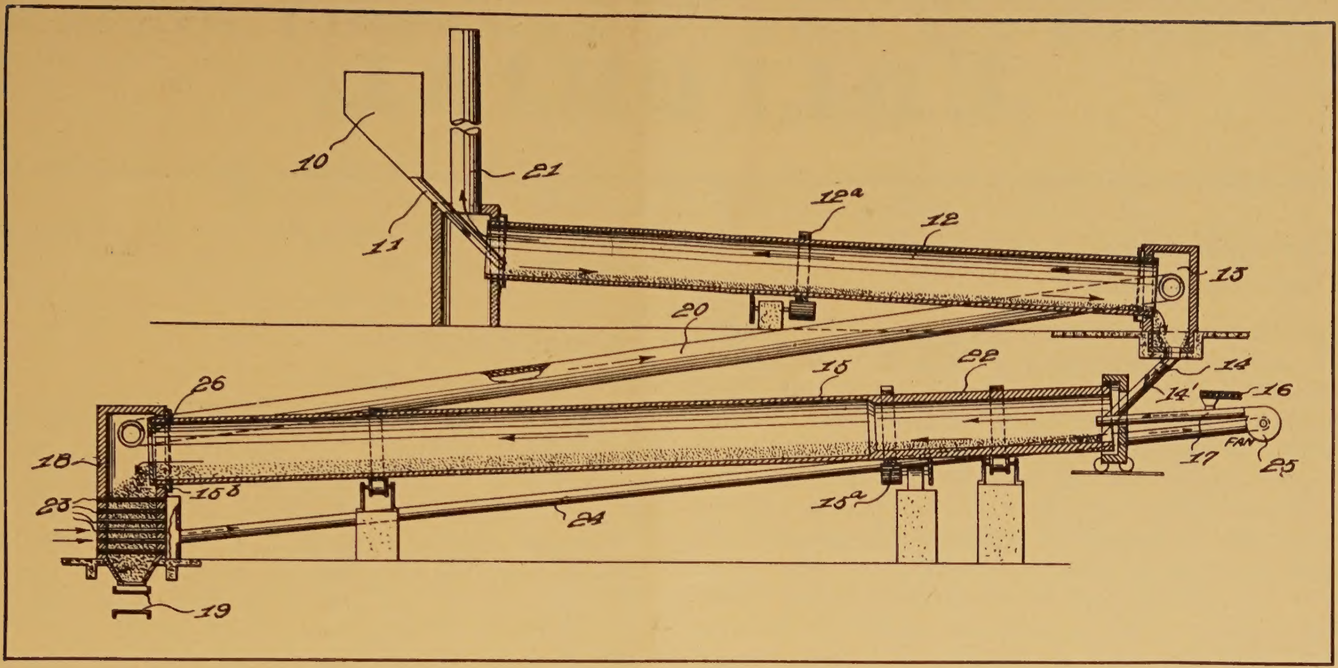
[1] U. S. Patent No. 1,912,811.



Longitudinal section showing use of two short rotary kilns, one above the other, in new burning method that improves physical and chemical properties of cement

of 500 to 700 F. is low for a 125-ft. kiln when a relatively dry raw feed is used. This method of burning offers a capacity equal to the use of two kilns operating in the usual manner independently of each other.

Increased uniformity of product results in better efficiency and economy. With this new method of burning it is possible to hold the temperature of the exit gases from the lower kiln within a variation of 20 deg. F. for a period of 24 hours or longer. A heavier feed can be carried in the lower kiln. Thus, with the increased volume of feed and increased potential heat in the kiln the temperature is more readily maintained constant even though the flame may fluctuate temporarily.

The more important advantages of this method may be summarized:

(1) A more uniform burn due to a longer burning zone and constant temperature.

(2) Ability to burn a varied feed size, including fines, in lime burning.

(3) Increased efficiency as a result of better uniformity in burning and less heat loss.

(4) Improved physical and chemical properties of the resulting product, due to better control of time and temperature.

Influence of the Addition of Trass on Shrinkage of Cements

TRASS is a volcanic earth which is frequently employed in the manufacture of hydraulic cements. The purpose of the study here mentioned was that of determining if the addition of this volcanic product to different types of cement exerted an influence on the shrinkage of these cements.

The cements used in the course of this study were selected in three categories: (1) standard portland cement; (2) high-early-strength portland cement; and (3) Kuhl cement.

In all of these cases it has been established that the least shrinkage occurred in the specimens cured under water for a long period. The resulting action due to the addition of trass to cement was considerably more noticeable in the case of standard portland cement than with the other two products.

The increase in shrinkage in the high-early-strength portland cement samples is negligible when the proportion of trass added does not exceed 10 per cent. The addition of further quantities of trass—above 10 per cent—then increases the shrinkage, and this increase becomes quite rapid.

The addition of any proportion of trass, not exceeding 20 per cent, to standard portland cement causes an appreciable reduction in shrinkage, this reduction reaching its maximum effect when the proportion of trass added lies between 10 and 15 per cent. On the contrary, if the proportion of trass added to standard portland cement exceeds 20 per cent, an opposite effect is observed, and the results are identical with those obtained with high-early-strength cement.—A. Steopoe, in *Bull. Chim. Soc. Romana Chim.*, 1931.

EDITORIAL

This Definition Does Not Define

THE paper on cements presented by P. H. Bates at the annual meeting of the A. S. T. M., and abstracted in the main section of this issue, again draws attention to that much-discussed question of the definition for portland cement, wherein the addition of "calcined or uncalcined gypsum" is permitted.

Mr. Bates very properly asks what is meant by the expression "calcined or uncalcined gypsum." He quotes from A. S. T. M. standard C22-25, to the effect that "no material may be considered gypsum within the meaning of this specification which contains less than 64.5 per cent, by weight, of $CaSO_4.2H_2O$." Nothing is specified as to what the remaining 35.5 per cent may be.

Therefore, as Mr. Bates says, to each 93.5 lb. of clinker a cement manufacturer may add 6.5 lb. of "gypsum" containing up to 2.2 lb. of calcium chloride, diatomaceous silica, pumicite, tufa, soluble silicates, ground limestone, or tannic acid, and still be furnishing a cement meeting the A. S. T. M. definition.

On the other hand, those manufacturers who add sand or iron oxide to their raw mixture are not making portland cement—according to the definition—because argillaceous and calcareous raw materials alone are permitted, and neither sand nor iron oxide can be classed as such.

It is evident that the definition for portland cement needs an overhauling in keeping with the overhauling of the specifications which Mr. Bates urges so strongly in his comprehensive paper.

Price Too Low—Bids Rejected

A REFRESHING change in the attitude of the federal government toward the cement industry is seen in a report from Mississippi, to the effect that the Bureau of Public Roads at Washington has caused the rejection of bids for one million barrels of cement for future delivery. The underlying reason for this action was that bid prices were too low.

The Mississippi highway commission had taken the bids as a hedge against future price advances. Washington officials, however, took the position that before the dates of delivery the prices stipulated in the options taken by the commission would be below the cost of production. This, it was felt, would be contrary to public policy as embodied in the National Industrial Recovery Act.

This unexpected action may indicate the discontinuance of the badgering tactics against the cement industry, so evident throughout the life of several federal administrations.

A Caution Sign on Siliceous Co-Mixtures

A TIMELY warning in regard to the addition of siliceous materials to portland cement was sounded by T. C. Powers, in his discussion of Carlson and Troxell's paper presented on June 30 at the 36th annual meeting of the A. S. T. M. The paper in question described the effect on volume change, compressive strength, and heat generation, when siliceous materials are added to portland cement.

Mr. Powers asserted that the material used in the tests reported by Carlson and Troxell is the most efficient of all the more or less puzzolanic materials which he has considered in studies and tests of puzzolanas extending over a period of about four years. He pointed out that, according to the paper, blends of portland cement with this particular material brought about greater volume changes than when portland cement alone was used. When such results are obtained with comparably efficient materials, Mr. Powers declared, there is need for caution in the use of all puzzolanic materials.

From the information now available it appears that not every siliceous material is suitable as a co-mixture with portland cement, even though its chemical analysis may be correct and its fineness and particle-size distribution are carried to the proper degree.

The real question is whether the siliceous material being used is chemically active to a degree sufficiently high to enable it to convert all the lime liberated during the hardening process into an insoluble lime silicate. If it does that, it has accomplished its purpose, for the insoluble lime silicate so formed is not acted upon by ordinary water or by sea water containing dissolved sulphates. In place of soluble free lime, which may be leached out, there is a hard, insoluble substance that adds to the density and durability of the concrete. These matters are clearly set forth in an article by Dr. Lazell in the April (1933) issue of the Cement Mill Edition of "Concrete."

It is not enough to use volcanic deposits, or fly ash, or blast-furnace slag, unless it can be demonstrated that the material under consideration, when pulverized, possesses the necessary degree of chemical activity.

Let us repeat that chemical analysis alone is not a proof of suitability. The indiscriminate use of siliceous materials, whether employed as co-mixtures with portland cement in the production of slag cements, or as admixtures at the concreting plant, will discredit the meritorious along with the inefficient materials.

Future Costs and Prices Are Problem for Cement Industry

Should Prepare for Increased Shipments, Manufacture of Special Cements, and Rising Costs of Production

By EDWIN C. ECKEL
Mining and Engineering Geologist, Washington, D. C.

IT would be difficult to over-estimate the extent of the revolution, both political and economic, that has been accomplished in America during the past six months; it is still more difficult to come to any reasoned conclusion as to its probable ultimate end.

If we were being led clearly into frank communism the matter would be far simpler; the difficulties arise because we do not know just how far the present process of socializing the United States is likely to go. My own feeling, based on both political and economic considerations, is that it will not be until late Fall that we can come to any fair ideas as to the probabilities ahead of us.

Decisions Must Be Made Now

Meantime, however, there are decisions to make, by everyone interested in any line of productive industry; and some of those decisions can not be postponed until we reach a period of certainty, or at least of temporary fixity in conditions and in policy. Those decisions will have to be made far in advance of certainty, in the light merely of past experience, political and economic. The present suggestions must be accepted as merely tentative; events may take any one of several possible turns, and among them are some which might entirely upset any reasonable attempt at prevision. Nevertheless there are some points which under any circumstances may profitably be kept in mind by all concerned in the cement industry, as in others.

Predicts Big Increase in Cement Shipments

The first point is that in this broad attempt at state socialism we are going to see very heavy tonnages of cement used in public and semi-public works, so that earlier pessimistic estimates by industrial leaders may well be revised upward very sharply and very promptly. Unless the socialistic trend is checked this year—and frankly I do not think that is one of the possibilities—American cement production in 1934 and 1935 may easily break all former records. That is one fact which it will be well to keep in mind, because far too many mills and companies are not today prepared to increase outputs very heavily.

Special Cements Will Be Demanded

The second fact, which might as well be accepted, distasteful though the idea may be to many, is that we will see higher and more specialized requirements for cement, as for other products.[1] These will be easily enforced because of the very fact that so large a proportion of the work will be of a public nature, under control of engineers to whom the Boulder Dam specifications may be merely one stage in advance, and not the final attainment. So mills and companies should be prepared, both in machinery and in raw materials, to easily respond to a demand for unusual products, as well as for a large amount of normal cement.

Rising Costs Must Be Faced

Finally, we must accept the fact that costs will rise sharply, not only to match a 75 or 80 cent dollar, but for other reasons. The point of importance here is that in order to keep a reasonable margin of profit the companies, individually and as a whole, must maintain somehow entire flexibility in prices. That does not mean that some reasonable minimum should not be established; it does mean that they must retain very free hands as to maximum prices if they are successfully to meet the certain problem of steadily rising costs. It is for this reason that some of us feel that any modification of anti-trust laws would be very dearly purchased if it is paid for by government price regulation. We may admit that during periods of stable prices, or of falling prices, government regulation may be a desirable and necessary feature of American industry in the state-socialized future. But during inflation periods, with price and wage levels being forced up at the option of the currency-issuing government, it is obvious that no government agency can act quickly enough to respond to the necessities of the case. And, until we secure further evidence, we must now assume that we are facing a period of planned inflation, whose limits not even its proponents can foresee or control.

Dickinson, Marquette Founder and Head, Passes Away

Theodore G. Dickinson, founder and president of the Marquette Cement Manufacturing Co., Chicago, passed away on Sunday, July 2, at his home at Libertyville, a suburb. Death came during sleep and was attributed to heart disease. He had been active in business up until the day of his death.

Two children, Robert B., an official of the company, and Rose L., survive. Dickinson was divorced in 1925 from Mrs. Mary B. Dickinson.

A copy of the will was filed for probate at Miami, Florida, on July 8. No estimate was given as to the value of the estate. Walter A. Wecker, secretary and treasurer of the company, was recommended as executor. Various bequests are made and the residue is left to Bertha K. Evans, of Chicago, Mr. Dickinson's secretary.

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[1] In this connection, see 1933 Preprint No. 43, A. S. T. M., of paper by P. H. Bates, on "Status of Specifications for Hydraulic Cements in the United States."—Editor.

The will, dated June 23, this year, gives 1,000 shares of Marquette company stock to Dickinson's son, 500 shares to the daughter, and 400 shares to Richard Moyle, general superintendent of the Oglesby, Ill., plant.

Conn's Letter to the President

Hon. Franklin D. Roosevelt
President of the United States
White House
Washington, D. C.

Dear Mr. President:

The cement industry of the United States, represented by the Cement Institute, desires to co-operate with you heartily and at once in your endeavor to increase purchasing power and employment. It had hoped to present its code promptly, but variations in practice in different parts of the country, present such difficulties that it may still require some time to complete the code, ready for submission to the industrial recovery administrator.

The resulting delay is particularly undesirable because of the need of prompt increase in purchasing power. Sensing this need many mills have put wage increases and reductions of hours into effect in the last two weeks. But the industry feels that this movement should promptly be made general, and without entailing the delay that would be involved in waiting for the completion of its code.

Accordingly we have today transmitted a letter to the industrial recovery administrator, Hugh S. Johnson, informing him that a minimum wage of 40 cents per hour, with appropriate increases for wage earners in the higher classes, and a maximum time of employment of 36 hours per week, will be put into effect generally in the cement industry as soon as possible but not later than August 1, the minimum wage to be subject to adjustment due to the variations of conditions geographically. The time of 36 hours is to be the average over a six months' period, with permission to work a maximum of 42 hours in any given week.

For your information let me add that the Cement Institute represents the industry in every part of the country and includes in its membership 91 per cent of the plants and 97 per cent of the productive capacity.

We trust, Mr. President, that this method of increasing purchasing power promptly, without causing delay on account of other features of the code, will meet with the hearty approval of yourself and the administrator.

Cordially yours,
CHAS. F. CONN
President, Cement Institute.

11 East 44th Street
New York, N. Y.
July 13, 1933

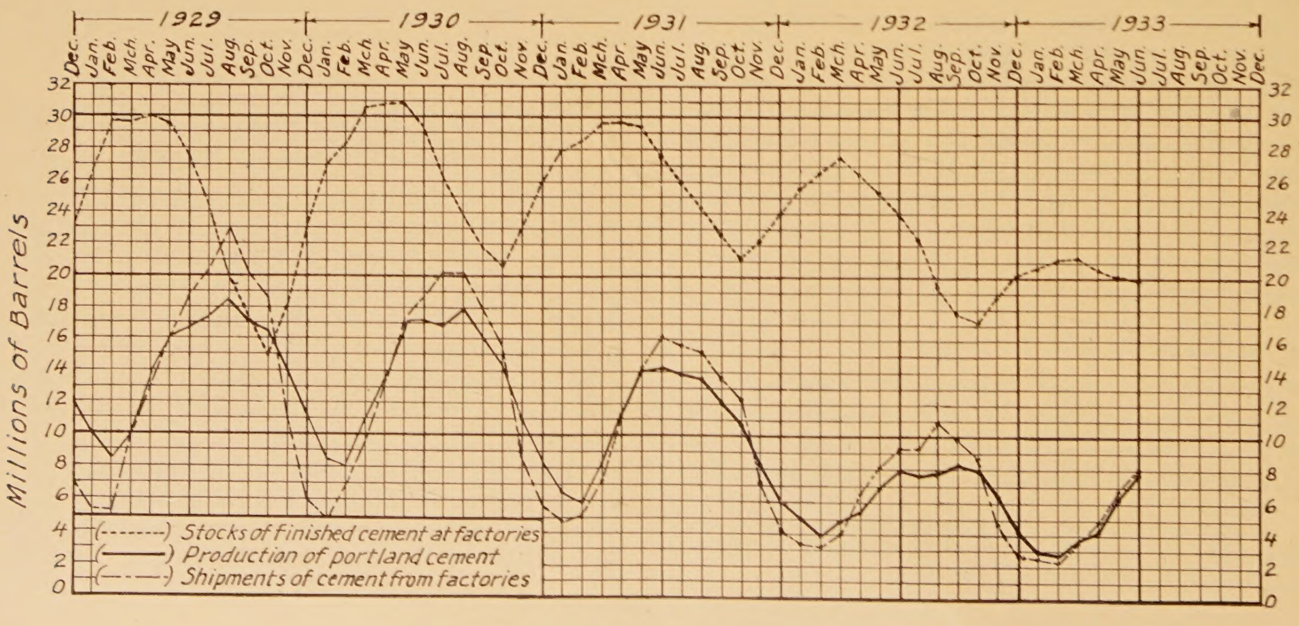
Cement Statistics for June

Relation of Production to Capacity (Per Cent)

	The Month	Twelve Months
June, 1933	35.2	26.0
June, 1932	35.7	36.5
May, 1933	27.4	26.0
April, 1933	18.9	26.2
March, 1933	16.1	26.7

Production, Shipments and Stocks of Finished Portland Cement (Barrels)

	1932	1933
Production, June	7,921,000	7,804,000
Shipments June	9,264,000	7,979,000
Stocks at end of month	24,043,000	19,942,000
Production for year to date	34,156,000	27,668,000
Shipments for year to date	34,304,000	27,927,000



✦ PERSONALS ✦

W. H. Klein, general manager of the southern operating division of the Pennsylvania-Dixie Cement Corp., has been named assistant to Blaine S. Smith, president of the company. This is a newly created position.

Mr. Klein will continue as southern operating head and will maintain his headquarters at Chattanooga as at present.

W. A. Wecker has been elected president of Marquette Cement Manufacturing Company. He will continue to serve as treasurer. Stuart Duncan, LaSalle (Ill.) banker, was elected chairman of the board, a newly created position. W. W. Dickinson and Richard Moyle, Sr., were chosen vice-presidents, V. J. Hanley was named secretary and assistant treasurer, and D. S. Colburn becomes assistant to the president.

John A. Blank, consulting chemist, Compania de Cemento Portland "Landa," S. A., Puebla, Mexico, left recently for his home in Ironton, Ohio, after having spent the greater part of the past year in Mexico assisting the Landa Company in the development and placing on the Mexican market of new cements.

H. Vanderwerp, formerly located at the Chicago Medusa office, is now located at Cleveland, as vice-president in charge of operations of the Medusa company.

He succeeds W. L. White, Jr., resigned.

Harold B. Robeson has been appointed vice-president of the Nazareth Cement Co., Nazareth, Pa. He will continue the direction of sales.

Further Discussion of Different Types of Cement

In recent years much emphasis has been placed on the composition of portland cement and present-day manufacturing procedure, and many users of cement are demanding more light on the subject.

As pointed out in the leading article in last month's issue, there is a rapidly growing feeling that standard portland cement must be supplemented by other types of cement for special purposes.

It is possible to manufacture a variety of cements to meet a variety of specifications and uses, and to control factors such as heat of hardening and durability, without altering in any way the other features desired in cements.

These problems will form the subject of further discussion in an article to appear in the September issue, amplifying the article published in July.—Editor.

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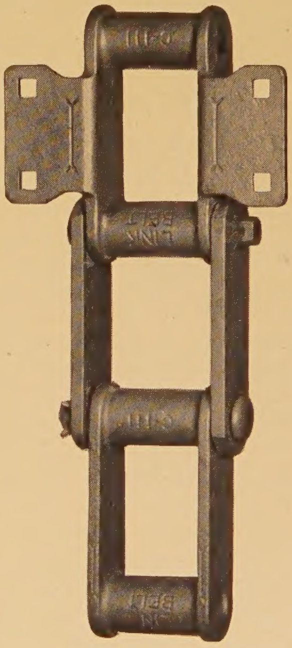
Promal is a metal of advanced physical properties. Its merit is not a surface quality, but goes all the way through — the whole metal is Promal. For incomparable strength, toughness and wear resistance, specify Promal Chains and Buckets. Send for Book No. 1050-A and Steel Chain Book No. 1192.



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LINK-BELT
See our exhibit at A Century of Progress, Chicago

MILL EQUIPMENT

Single-Stage Water-Cooled Rotary Air Compressor

A complete line of up-to-date rotary air compressors and vacuum pumps of the multi-cellular, sliding-vane type, in both water-cooled and air-cooled designs, is now made available by the Allis-Chalmers Manufacturing Co., Milwaukee, Wis. The line covers a range of volumes from 50 to 2000 c.f.m. at pressures up to 150 lb., and vacuums up to 29.85 in. mercury. The air-cooled units are suitable for pressures up to 10 lb. G., and vacuums up to 18 in. Hg., and the water-cooled units for higher pressures and vacuums.

The smooth operation, small dimensions, continuous delivery and absence of maintenance requirements are a few of the advantages claimed. No belts or pulleys are normally required, as the units operate at standard motor speeds. The design is extremely simple, involving no valves or complicated motions. All working parts are totally enclosed, but easily accessible.

The addition of these compressors rounds out the lines of centrifugal and reciprocating machines already manufactured by the company.

●

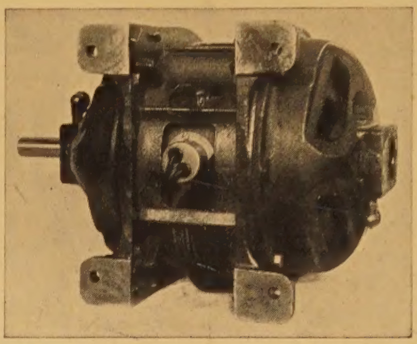
Self Protecting Thermoguard Motors Are Announced

To give adequate protection against overheating in industrial motors, the Westinghouse Electric & Manufacturing Co. announce "Thermoguard" motors, having a built-in disc thermostat that functions before the temperature of the insulation reaches the danger point. For the first time, the combination of a motor with built-in thermostat and a control device with a separate thermal overload relay meets all requirements for motor protection against burnouts. Thermoguard motors are said to afford a degree of insurance against production losses and maintenance expense never before attainable.

Thermoguard induction motors are available in standard horizontal type, side mounting, fan cooled, explosion tested, vertical hollow shaft, enclosed or splash proof. This is said to assure complete protection against overheating regardless of their mechanical form. The new principle of built-in protection against overheating is applied to squirrel cage induction motors and wound rotor induction motors.

Thermoguard direct current motors are designed for constant, adjustable, and varying-speed applications. They can be used for continuous or intermittent service for such drives as machine tools; pumps, including those for mine service; fans; blowers, etc. Thermoguard mill motors are designed for heavy duty applications such as cranes, hoists, shovels, mine hoists, railway turn tables, conveyors, etc.

High speed synchronous Thermoguard motors are designed with built-in protection against overheating for all types of constant speed machinery such as fans, blowers, compressors, pumps, etc. Synchronous motors afford an economic means of improving power factor and thereby reducing power costs.



Industrial Literature

Screen Bulletin

Aero-Vib screens are described in *Bulletin* 1474, dated June, 1933, and issued by the *Allis-Chalmers Manufacturing Co.*, Milwaukee, Wis.

The screens are described as rugged and light in weight, with mechanical construction consisting of only the body and the vibrating mechanism.

Operation, sectional and assembly views are shown and principal dimensions given.

●

Souvenir Book

Available to requests made on business letterheads, the *Souvenir Book* 1933 of the *Link-Belt Exhibit* at A Century of Progress, Chicago, is now being distributed.

This is a booklet of 48 pages, presenting a bird's-eye picture of the firm's products, as well as a composite view of its sixteen plants and of the current exhibit.

●

G-E Leaflets

Leaflet GEA-1771 is descriptive of a telechron-motor-operated automatic timer, and *GEA*-1765, covers G-E fractional horsepower gear-motors.

Both publications are newly issued by the *General Electric Co.*, Schenectady, N. Y.

Hard-Facing Excavating Equipment

Increased life and savings effected through the application of hard-facing materials to the wearing parts of excavating and dredging equipment are described in a 16-page booklet, *"How Hard-Facing Saves Money for Contractors,"* issued by the *Haynes Stellite Co.*, New York City.

Several types of hard-facing materials are discussed including the non-ferrous cobalt-chromium-tungsten alloys and welding rods consisting of particles of crushed tungsten carbide bonded together with steel. The procedures for hard-facing by both the oxy-acetylene process and the electric arc method are also briefly described, and such useful hard-facing information as recommended welding processes, thickness of deposits, metals that can be hard-faced, etc., is listed conveniently in a table.

The greater part of the booklet is devoted to actual applications where the hard-facing process has been used to protect wearing parts of many types of excavating and dredging equipment.

●

Thickener Principles

The Genter thickener is described and illustrated in a 4-page folder issued by the *Genter Thickener Co.*, having headquarters at Salt Lake City, Utah.

The principles of operation are described as follows: ". . . removes the solids from suspension by filtration; the liquid is passed through a filter medium which retains the suspended solids on its exterior and these solids are removed in cake form, periodically and automatically, into the mixture being thickened. The solids sink to the bottom of the tank and are removed to a central discharge point by means of a slowly revolving rake mechanism."

Field Activities

B. & W. Detroit Manager

The Babcock & Wilcox Tube Co., Beaver Falls, Pa., announces the appointment of *T. F. Thornton* as sales manager of the Detroit district, with headquarters in the Ford Building, Detroit.

For many years, Mr. Thornton has been connected with the automotive and steel industries, and for the past six years he has had charge of the sale of tubular products of the Pittsburgh Steel Co. in the Detroit district.